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United States Patent [19]**Kuriakose et al.**[11] **Patent Number:** **6,073,478**[45] **Date of Patent:** **Jun. 13, 2000**[54] **HYDROGEN SENSOR USING A SOLID
HYDROGEN ION CONDUCTING
ELECTROLYTE**[75] **Inventors:** **Areekattuthazhayil K. Kuriakose,**
Nepean; **Nicola Maffei,** Ohawa, both of
Canada[73] **Assignee:** **Her Majesty the Queen in right of
Canada, as represented by the
Minister of Natural Resources,**
Ottawa, Canada[21] **Appl. No.:** **09/016,391**[22] **Filed:** **Feb. 2, 1998**[51] **Int. Cl.⁷** **G01N 27/00**[52] **U.S. Cl.** **73/23.4; 73/23.28**[58] **Field of Search** **73/23.2, 23.21,
73/23.28, 23.4**[56] **References Cited****U.S. PATENT DOCUMENTS**4,143,316 3/1979 Roy et al. 73/23
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94/28403 of 1994 WIPO .*Primary Examiner*—Max Noori
Attorney, Agent, or Firm—Robert A. Wilkes[57] **ABSTRACT**

A reliable gaseous hydrogen detection and measuring device which is simple, easy to use, does not require any reference gas supply, and which can be of reasonably rugged construction. The device utilizes a disc comprising a solid state ceramic hydronium conductor of the general formula $\text{Na}(\text{H}_3\text{O})\text{Zr}_2\text{Si}_2\text{P}_{(3-x)}\text{O}_{12}$ together with a silver based electrode system on one side, and a catalytic noble metal electrode, such as platinum, on the other. By measurement of the output voltage across the electrodes, both the presence, and the amount, of hydrogen in a gaseous system can be determined.

13 Claims, 4 Drawing Sheets